

## ***Interactive comment on “Eight-component retrievals from ground-based MAX-DOAS observations” by H. Irie et al.***

**Anonymous Referee #1**

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This paper reports multi-component retrievals from MAX-DOAS observations. It has been previously known that MAX-DOAS technique can provide remote measurements of absorbing trace gases and aerosol extinction. I have two major concerns for this paper's scientific merit. This it is suggested that it should be greatly revised to answer major comments below.

Authors claim that they have attempted to retrieve vertical profile information for 8 components. However, the paper reports only average concentration values near the surface with crude vertical resolution of 1 km. Figure 2 shows that concentrations of trace gases except ozone are all zero > a few km height. It would be very nice if profile information with finer vertical resolution near the surface where trace gases are concentrated is given by the authors' retrieval algorithm.

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Authors used CHIEIRE CTM model results, which is based on assumed emission inventory data for validating their MAX-DOAS measurements. However, it is not appropriate to use model simulation results to validate measurement results. It would be better use independent observation results measured by in-situ sensors at the tower during the CINDI campaign. Furthermore correlations between MAX-DOAS measurements and CHIMERE simulation are not so good for most of trace gases. It seems that aerosol, NO<sub>2</sub> and water vapor were measured at the tower during the campaign. It would be better if authors focus the discussions of the paper toward more detail investigation on the validity of their retrieval for those parameters with finer vertical resolution. Inclusion of more complete error analyses for those parameters is also need to improve the scientific quality of the paper.

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